which I can assign no other cause but the action of the lead. She was, until the last I saw of her, blind and paralysed. Her friends took her with them from the town, and I have no doubt that ere this she is dead or the inmate of the Chronic Paupers' Home, probably the latter; for, as I have said, this disease is slow to mercifully kill, but leaves a destroyed body to crawl through poverty and life with all the unhappy reflections such a condition of helplessness entails on the poor.* These two cases, abstracted from many, serve strongly to show why this disease should interest us, and in their instruction give us zest to turn from their depressing details and look upon what we may more callously consider the pathology and treatment of the disease.

I am aware that time will not permit me fully to discuss its pathology. I will then briefly lay before you what is known concerning it. Considerable attention has been paid to the subject by Drs. Burton, Fletcher, William Budd, Wilson, Parkes, Martin, and Hunter, in Great Britain; and MM. Andra, Duvergie, and Gubourt, De Hain and Louis, abroad. The result of investigations may be summed up as follows. Lead has affinities for all the tissues in the body, and can be detected in the tissues many months after it has first demonstrated itself, thus indicating how slowly it passes out of the system (*Dublin Medical Press*, 1874). Fletcher found, in the case of a man suffering from colic, as much as 4.8 grains of metallic lead in one hundred grains of solid matter in the urine. Some consider that it forms a chemical union with the tissues of the body. As I have said, death comes very slowly. As the direct result of this disease, Andra gives the number as one per cent. I should be disposed to put it even lower than that. In this disease, a persistent anæmia is excited; and I have noted that this and the cachectic habit leave them prone to fevers and ulcerative affections. I have often noted the marked effect lead has locally, the painter and plumber invariably only suffering from paralysis of the extensors of the arm when affected, which is usually preceded and accompanied, unlike other paralysis, by intense aching pain of the part affected. In these trades, they are constantly in their employment handling leads; they first complain of aching pain spreading up the arms, and ultimately ending in paralysis of the extensors. As a rule, sensation is not affected; here, in these cases, the nerve seems to lose its motor power by being locally inoculated by the lead: as the pain spreads backwards so the paralysis extends. On the other hand, in the lead-workers, where the system entirely is affected, where sight, hearing, general paralysis, and colic often show themselves, you have the ingestion into the lungs by vapour; you have the absorption through the skin, and too frequently through the stomach, through their habit of eating with unwashed hands, and the poison thus becomes attached to the food. When these paralysed muscles are examined, they are found yellow and soft; this has been looked upon as pathognomonic of the action of lead upon the muscular tissue, but may we not venture to suppose that it is chiefly the fatty degeneration usually accompanying disused muscle assisted in these cases by the great anæmia? for lead in the system is found to cause absorption of the red corpuscles, and induces an anæmia of the body. Dr. Garrod says that, "if lead be taken for a long time, it causes the blood to become impregnated with uric acid; and thus it is common to find gout, with its distressing enlargements, prevailing amongst those who have been affected by lead-poisoning". When *post mortem* examinations are made in those which have died in the colic, great contraction is found in the colon and sometimes in the cæcum; the bowels are often intussuscepted. In the cases where the body has been for some time under the influence of this poison, the diseased action spreads backward from the local seat of contagion or primary attack and goes on to permanent general paralysis, blindness, and deafness; the nerve-tissue is found to be affected; it is pale, soft, and aqueous; the brain-convolutions become separated by a semi-opaque fluid, and the convolutions themselves are much shrunken.

The treatment of this fearful disease in its early stages is simple and generally effectual. Small doses of sulphate of magnesia with diluted sulphuric acid and opium relieve the constipation and remove the colic by its supposed power of converting the poisonous carbonate into the insoluble sulphate of lead in the tissues; for it seems to be only the carbonate and oxide of lead that act so deleteriously. When the case becomes more chronic and obstinate, hot baths, Turkish baths, if obtainable, a pill made of one-third of a grain of morphia, with one-third of a grain of extract of belladonna, every four hours for twelve hours, is most efficacious in relieving the spasm of the gut. I have also used the interrupted electric current on the abdomen, alternated

with hot baths during a severe colic. After the administration of the above pill and mixture, with the happy result of affording relief to pain, which before, at a previous attack, was much more prolonged before being relieved, iodide of potassium in large doses of twenty grains, when the case assumes a chronic form, seems to act then the best. I may here mention that I have never had a case of iodism or distress since I have given these large doses, although some have taken that dose three times a day for months, whilst I have had two or three so affected who only had two to four grains for a dose. Whilst taking the iodide, I advise Turkish baths with precipitated sulphur, good and nutritious diet and porter.

I may here point out that faradisation is mentioned as a useful agent for diagnosis; for, under the influence of lead-impregnation, the excitability of the muscle is much diminished and frequently lost to this stimulus; and, as I have before mentioned, it is an useful remedial agent, if persisted with.

The therapeutics of this disease I believe I have exhausted. If the patient take the earlier warnings, I consider our armaments sufficient; but, if it be allowed to become chronic, I fear it is a disease of such rancour, that we are nearly vanquished. What long-continued generous diet would do we are not permitted to try, for these cases occur in the poorest classes. As a trade-disease, I presume it is inevitable; yet we cannot but look upon its ravages with pity; the patient might mitigate these ravages by scrupulous cleanliness, but the half-hour they have for breakfast cannot be considered sufficient to enable them to adopt the precautions they know to be requisite. It is, indeed, surprising to observe how many return to this employment, which has so often prostrated them.

I trust I have not wearied you; but, as I have said, I felt, in trade diseases, this was one of the first importance; I therefore determined to bring it before you when I saw it was not on the list by any other member, and I sincerely trust I have not taken up your time uselessly or without your approval.

ON THE ADMISSION AND RETENTION OF FOREIGN MATTERS IN THE LUNGS.*

By CHARLES ELAM, M.D.

My intention, in the following brief remarks, is to illustrate by some few cases the possibility of the reception by the lungs of foreign matter of sensible and even considerable bulk, and its retention for undefined periods, without the necessary and immediate production of urgent symptoms, the facts furnishing (as I hope) a not altogether unimportant or uninteresting contribution towards the natural history of the special local diseases of Sheffield.

Apart from the domains of surgery in relation to gunshot-wounds and accidents generally, into which I shall not enter at all, the literature of this subject is not extensive. With regard to the casual lodgment of bodies in the air-passages, much interesting matter may be found in Erichsen's *Science and Art of Surgery* and other systematic works of the same nature; but this is entirely apart from my proposed subject. I may, however, in passing, allude to a remarkable case which came under my notice some years ago, in which, during an epileptic attack, two artificial teeth were detached from the jaws and found their way into the right bronchus, where they remained, causing very urgent symptoms and ultimate death.

The general impression with regard to the lungs is that, although dust and very fine or impalpable powders may penetrate to them, yet generally anything of more sensible size and individuality is stopped at the larynx and rejected by the reflex functions of the glottis. As a general rule, this is correct; but it must, as will be shown, be received with limitations. It is further supposed that, in case larger substances do gain admission to the lungs, they cannot remain there long without exciting considerable local and general disturbance. This also is ordinarily correct, but, as one of my cases will show, is not invariably so. I propose, from a very large number of cases, only to allude to three on this occasion: the first illustrative of the retention of metallic particles in the lungs, the second to the retention of sand, and the third to the retention of coal, not in the form of dust, but of actual pieces of coal of sensible size. The first two are sufficiently common, I believe, to require but a passing notice; so far as I know, the third is unique.

CASE I.—T. S., aged 27, a fork-grinder, was the subject of the first observation in 1864. He had been subject for some years before

* I may here say that until after this paper was written, I did not know of any other recorded case of lead-amaurosis. In the *JOURNAL* of the 22nd of this month, one case is recorded by Dr. Reid and two others mentioned. Until I read of these, I fancied this case of mine was unique.

* Read before the Medical Section at the Annual Meeting of the British Medical Association in Sheffield, August 1876.

coming under my notice to occasional attacks of "grinder's asthma", as it is popularly called. The precise pathology of this affection has been much disputed. I believe it to be merely a form of capillary bronchitis, specially and constantly aggravated by the irritating presence of metallic particles in the air, and by the other physical conditions of wet and exposure under which the avocations in question are carried on. I prefer the name of "destructive bronchitis", as more descriptive of this affection, as there is undoubtedly in many, if not all, of the fatal cases a destruction of portions of the tissue of the lungs, resulting in cavities, sometimes of considerable dimensions, even where there has been no indication or suspicion of tubercle. The general symptoms which precede the fatal termination of these cases do not differ in any important particular from those of phthisis. In the case of T.S., there was nothing exceptional to require special notice; I shall only allude to the condition of the expectoration during life, and to the state of the lungs after death.

The sputa were of the character usually met with in "peripneumonia notha". The microscope did not reveal any granular tuberculous matter; but there were many minute casts of the ultimate bronchial ramifications and very frequent shreds and filaments of disintegrated lung-tissue, in addition to those matters ordinarily characterising the expectoration. There was no chemical investigation made of the sputa; but, after death, in the walls and contents of the numerous small vomicae found at the posterior part of both lungs, the presence of iron in rather large quantities was easily ascertainable. This must have been due to the fact, that he continued working at intervals until within a short time of his death; and that, towards the last few days of life, the expectoration was difficult and scanty. The lining also of the cavities would probably be more tolerant of the presence of foreign matter than the bronchial membrane in its normal state.

I am also strongly inclined to believe that the indulgence in alcoholic drinks produces a kind of tolerant anæsthesia, which might favour the retention of ordinarily irritant matters; and T. S. and the subject of the next observation were both of intemperate habits. The detection (chemically) of the iron is most readily accomplished by perfectly calcining the tissue, dissolving the soluble portion of the residue in mineral acid, and then adding sulphide of ammonium, which indicates the presence of iron by a black precipitate.

CASE II.—W. M., aged 31, the subject of the second observation, was a stonecutter. He was accustomed to work at the lower end of a long saw employed in cutting blocks of stone. During this operation, the face is generally defended by a kind of wirework mask; but he, by his own confession, had frequently dispensed with the protection, because it interfered with his pipe. I give no details of his illness, as the history of most of these cases which are due to the inhalation of irritants is very uniform, and all are more or less closely allied to phthisis. In the sputa there were frequently observed little masses of granular appearance and of gritty feel. These were at first supposed to be broken up concretions, such as are found in cicatrised cavities, consisting of phosphate of lime; but, on being tested, they were found to be insoluble in any acid, and, in short, they proved to be merely sand glued together by mucus. After death, numerous cavities were found in various parts of the lungs, and some of them were almost filled with this same matter in a thin pasty form. This must have been in the lungs more than a month, as that time at least had elapsed since he worked last.

CASE III.—The subject of my third observation was a coal-miner, of whose previous history I know nothing. He came into the hospital merely to die, apparently in the last stage of phthisis. There was nothing very remarkable about either the general symptoms or the expectoration. The sputa were occasionally, but not constantly, dark-coloured, as though carbonaceous. They never presented the characteristics of the proper "black spit". There were evidences of cavities and much consolidation in the left lung. Over the whole of the right lung dulness was marked, with general absence of vesicular respiration, but no cavernous sounds. After death, I opened the chest myself. I found, as was expected, great disease of the left lung, but nothing to distinguish it from hundreds of other cases. It was far different on the right side. The lung did not collapse on opening the chest, but presented a hard, dry, dark appearance. On cutting into the lung, the knife was continually obstructed by small hard black particles, disseminated with tolerable uniformity throughout the entire lung. These particles were simply unchanged coal, preserving all its physical characteristics; they varied in size from a small pin's head to pieces nearly a quarter of an inch long, one-eighth broad, and about one-tenth thick. These were present by hundreds. Some of them appeared to be simply imbedded in the substance of the lungs, some were buried in partly softened tissue, but others again were distinctly encysted, completely enclosed in a fine, firm, transparent sac, and these generally preserved the peculiar lustre seen in the split surfaces

of some coals. There were no cavities. I cannot form to myself any rational or consistent theory of this case; I can only vouch for its perfect accuracy so far as I am able to describe a case which I have personally investigated with great care. It illustrates better than any other case I ever met with the tolerance that the lungs may manifest for foreign matters during an indefinite, but certainly a prolonged, period.

CLINICAL MEMORANDA.

POISONING BY PARAFFIN.

A CASE of poisoning by paraffin is mentioned in the BRITISH MEDICAL JOURNAL of September 16th. Let me mention another. A child, four years of age, was brought to the Surgery, having swallowed a quantity of paraffin a few minutes before. The chief symptoms were those of suffocation, with a constant cough, though there was no expectoration. The tongue, gums, and cheeks were blanched and swollen where the oil had touched them, and the child's hands were raised to the throat. But there was no vomiting of any kind. The mouth and throat were washed with olive-oil with good effect; the distressing cough ceasing before he left the Surgery. On going home, milk and castor-oil were ordered to be given; and in the evening the bowels had been freely moved, and the child had apparently quite recovered. I have no means of determining how much paraffin had been swallowed.

ROBERT SMITH, F.R.C.S.Ed.

MENINGITIS: RECOVERY UNDER THE USE OF MERCURY WITH CHALK AND IODIDE OF POTASSIUM.

A BOY, aged 6, had had persistent vomiting and headache for about a week before he was seen. The headache was paroxysmal, and so severe as to awaken the child from sleep; it was at first occipital, but afterwards frontal, and during the paroxysms the brow was very contracted. There were strabismus and dilated pupils, but they were equal and fairly sensible to light. There was also great intolerance of light and sound. The abdomen was retracted, and the *tache cérébrale* could easily be produced. The pulse was irregular and weak, and occasionally intermittent; and the respiration unequal and sighing. Improvement took place steadily under hydrargyrum cum creta in grain-doses, at first every four hours, and afterwards three times a day, and two grains of iodide of potassium with three grains of the bromide thrice daily. When convalescence began, iodide of iron and cod-liver oil were administered. A curious feature of the case was that, when he was first able to get up and move about the room, he walked with a jerky shuffling gait and back bent almost double; but he eventually walked quite steadily and perfectly erect. The cause was somewhat obscure. There was no history of accident or fright, none of tubercular taint; but the father had been for years a confirmed dipsomaniac. Another point of interest also is, that a sister of the child died of meningitis at the age of three years. I have thought this case worthy of recording, from the rarity of recovery from this disease in young children.

JOHN CROSS, M.B.Camb.

CASE OF ACUTE POISONING BY TARTAR EMETIC.

NINETEEN years ago, the daughter of a surgeon, aged 18, after an early dinner at 1 P.M., went into her father's surgery at 2 P.M., and mixed herself a draught composed of a teaspoonful of sodæ bicarb. and the same quantity of antim. tart., which she mistook for acid. tart. Observing that the draught did not effervesce as usual, she added more antim. tart., and then drank it off. She experienced a metallic taste in the mouth, but attributed it to some tamarinds which she had eaten at dessert. In a short time, she felt sleepy and powerless; black specks floated before her eyes, and she had to go to bed, where she lay rolling about, and became faint, with cold perspirations. At 3 P.M., she vomited her dinner, and was purged, and again vomited two or three times. She had pain in the lower part of the abdomen, with severe cramps in the lower extremities. At 5 P.M., Mr. Morley saw her; she was then in a state of extreme prostration, with tetanic spasm of the legs. With great difficulty, the legs were straightened, which gave great relief. The mistake she had made having been discovered, decoct. cinchonæ was freely administered, after which she vomited repeatedly. She suffered from enteritis for about three weeks, and gradually recovered. The only other effect of the poison was, that the hair began to fall off soon after the illness. The lady is now alive and well, but the hair on the crown of her head is very thin.

JOHN MORLEY, Barton-on-Humber.